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Atmospheric Measurement Techniques Discussions

Interactive comment on "Microphysical particle properties derived from inversion algorithms developed in the framework of EARLINET" *by* D. Müller et al.

Anonymous Referee #3

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General comment The manuscript presents the algorithms used in EARLINET for the retrieval of profiles of atmospheric aerosol microphysical properties using Raman Lidar profiles. The discussion is on two alternative approaches. The paper has been designed in order to present both methods in a separate way but trying to show the similarities and differences starting from the common core of this retrieval schemes. After section 2 the manuscript presents the analyses of each method in a way that do not favor a real comparison between both approaches. Including formal aspects like the elaboration of figures the paper seems a juxtaposition of two papers. I encourage the authors to apply to the whole manuscript the procedures they have applied to section 2. The paper is worthy to be published in AMT after the authors answer to

the criticism raised in the following lines and include the appropriate changes in the manuscript.

Particular comments As the manuscript includes two alternative retrieval procedures the introduction includes a separated description of the evolution of each algorithm. The methodology section includes the description of the two algorithms, in this way a general background including aspects that are common to both methods is presented before. This structure helps the reader to understand the similarities and differences between both methods. Here follows as a general comment on figures. The use of panels with various figures could be justified in terms of offering an overview on the tests performed, but there must be a compromise between the number of graphs in the panels and the size of these graphs to guarantee an appropriate illustration of the discussion. In this sense, I suggest to increase the size of figures included in the panels either reducing the number of graphs per panel or splitting the panels. This last comment applies specially to figures 4, 5, 6 and 7. Another comment on figures is related to differences in format depending on the link to one or other retrieval algorithm. The different basis of the methods justifies the differences in format of the figures 2 and 3, but the quality of this last one must be improved. Nevertheless, Figure 4 represents a study on PU method similar to that described in Figure 2 for TROPOS/UH method while the formats are really incoherent. In section 3 the graphical illustration used to present the discussion on simulation results must be similar for both methods. In fact the level of coordination shown in section 2 of the manuscript was not applied in this other relevant section of the paper. Detailed comments In section 2.2.1 it is appropriate to give a short justification of the number of runs, eight, used to evaluate the impact of uncertainties in the optical profiles derived from Raman lidar over the retrieved microphysical properties. The authors must explain the meaning of the acronyms: QT, RPCRI, IPCRI. . .

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 12823, 2015.